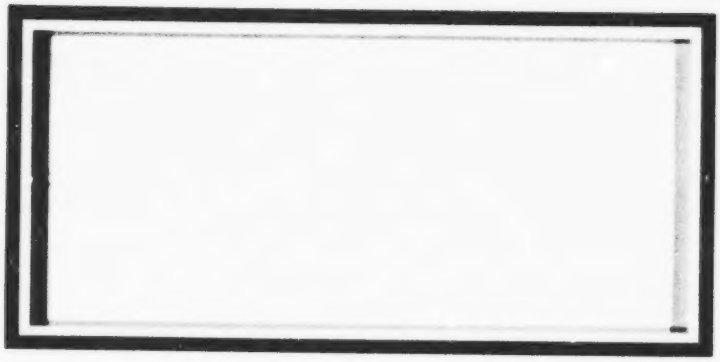

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Final Report P-4696-G-84-1

Molecular Weight Determination of CANMET Pitch Samples by Gel Permeation Chromatography

for

Energy, Mines and Resources Canada

CANMET
Energy Research Laboratories
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Ottawa, Ontario. K1A 0G1

Attention: Dr. Marc-Andre Poirier

DSS File No. 06SQ.23440-4-9131

by

Bejoy S. Das
Environmental and Chemical Engineering Division

October 11, 1984.

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Final Report P-4696-G-84-1

MOLECULAR WEIGHT DETERMINATION OF CANMET PITCH SAMPLES BY GEL PERMEATION CHROMATOGRAPHY

Fifty-four (54) pitch samples were received at ORF on August 2, 1984, from CANMET for molecular weight distribution analysis by gel permeation chromatography. The work was performed according to the procedures stated in our previous proposal to DSS (Proposal P-4514-G, dated December 19, 1984), and described in our previous contract work with CANMET/DSS, DSS File No. 18SQ.23440-0-9176, Serial No. OSQ81-00208, Final Report No. ORF 83-3, dated May 11, 1983, entitled "Chemical Characterization of a Number of Residual Pitches."

The GPC conditions used for the analysis of the pitch samples are shown in Table 1. The results of the analysis are shown in Table 2. The chromatograms and data of the 54 samples will follow in an appendix to this report.

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Research Scientist
Environmental and Chemical
Engineering Division

BSD/bmc

TABLE 1

GPC Conditions
in MWD Determinations of Pitch Samples

Instrument	:	Beckman Model 112 HPLC
Columns	:	500 Å Ultrastyragel + 10^3 Å Ultrastyragel (7.8 mm x 30 cm - Waters Associates)
Mobile Phase	:	Tetrahydrofuran
Flow Rate	:	1.00 mL/min
Injection Volume	:	20 µL
Sample Concentration	:	0.2 - 0.4% in THF
Temperature	:	Ambient
Detector	:	UV @ 254 nm, 0.64 AUFS (Beckman Instruments, Model 153)
Data System	:	Spectra-Physics SP-4100 with SP MWD-5 Program
Chart Speed	:	0.5 cm/min
Molecular Weight Standards	:	Polystyrenes: 35,000, 17,500, 4,000, 2,200, 955, 570 Styrene Monomer (104) and Benzene (78)

CRT

TABLE 2

GPC-MWD of CANMET Pitch Samples

Sample Identification	Mw	Mn	Mw/Mn
Petro-Can Type 1			
Original	2220	373	7.00
Maltene	1083	345	3.14
Asphaltene	7041	635	10.77
Gulf Type 1			
Original	3689	372	9.91
Maltene	1092	316	3.45
Asphaltene	9760	782	12.48
Blend 69			
Original	1043	246	4.23
Maltene	603	237	2.54
Asphaltene	2529	300	8.41
Blend 77-R			
Original	1116	253	4.40
Maltene	691	251	2.75
Asphaltene	2707	292	9.26
Blend 68-R			
Original	787	210	3.74
Original*	540	190	2.84
Maltene	491	203	2.41
Asphaltene	1187	222	5.34
Blend 64			
Original	755	263	2.86
Maltene	638	270	2.36
Asphaltene	737	259	2.84
Asphaltene*	1099	241	4.55
Athabasca Bitumen + 700°F			
Original	1502	265	5.66
Maltene	794	236	3.35
Asphaltene	3977	467	8.50

* Repeat analysis

Continued...

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TABLE 2

GPC-MWD of CANMET Pitch Samples

Sample Identification	Mw	Mn	Mw/Mn
Athabasca Bitumen + 800°F			
Original	1522	310	4.90
Maltene	877	285	3.08
Asphaltene	2975	511	5.82
Asphaltene*	2584	468	5.51
Blend 24 Pitch (84-CG-210)			
Original	298	151	1.98
Maltene	342	184	1.86
Asphaltene	324	143	2.26
IPPL Crude + 800°F			
Original	643	231	2.78
Maltene	563	226	2.49
Asphaltene	2523	499	5.05
Blend 79-R			
Original	677	206	3.27
Maltene	565	213	2.64
Asphaltene	1337	221	6.03
Petro-Can 85-100 pen			
Original	1139	358	3.18
Maltene	876	351	2.49
Asphaltene	2995	519	5.76
Blend 80-R			
Original	804	235	3.41
Maltene	617	235	2.62
Asphaltene	1378	211	6.52
Blend 83-R			
Original	936	221	4.22
Maltene	666	240	2.77
Asphaltene	1911	228	8.37

* Repeat analysis

Continued...

TABLE 2

GPC-MWD of CANMET Pitch Samples

Sample Identification	Mw	Mn	Mw/Mn
Gulf Asphalt 150-200 pen			
Original	1574	343	4.58
Maltene	974	319	3.05
Asphaltene	4229	613	6.89
Blend 24 Petro-Can Crude Oil + 750°F			
Original	946	257	3.68
Maltene	732	248	2.95
Asphaltene	2786	487	5.72
Blend 76-R			
Original	481	165	2.91
Maltene	421	171	2.45
Asphaltene	809	170	4.76
Blend 70-R			
Original	620	199	3.10
Original*	625	198	3.15
Maltene	505	203	2.48
Asphaltene	1270	235	5.40

* Repeat analysis

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